Messrs. Crosby Lockwood and Son will publish shortly a work on "Modern Lightning Conductors," by Mr. Killingworth Hedges, honorary secretary of the Lightning Research Committee.

An appendix to Mr. R. L. Taylor's "Student's Chemistry" has been published by Mr. John Heywood. It consists of two sections; the first part deals with the radio-active elements, and the second is an introduction to the study of organic chemistry.

We have received from the Art. Institut Orell Füssli, of Zurich, Nos. 177, 178, and 179 of their "Illustrated Europe" series of handbooks. The three parts are bound together in a convenient little volume with the title "Grisons Oberland." The guide book is by Dr. Chr. Tarnuzzer, and a historical sketch has been contributed by Prof. J. C. Muoth. The translation into English was done by Dr. and Mrs. Spöndly-Blakiston. Visitors to this interesting part of Switzerland will find interesting scientific, historical, and topographical information in this guide book. The book may be obtained in this country from Messrs. Hachette and Co.

Messrs. Oliver and Boyd have published the ninth volume of the "Reports from the Laboratory of the Royal College of Physicians, Edinburgh." The volume is edited by Sir J. B. Tuke and Dr. Noël Paton. The papers included fall under two categories; the first comprises fourteen papers describing researches on the ductless glands under the Mason fund, and the second consists of general researches in physiology, pathology, and pharmacology.

We have received from Mr. John Grant, of Edinburgh, a catalogue of scientific books, chiefly on botany, zoology, and geology, and a catalogue of recent purchases—including some well known works of science—all of which are offered at greatly reduced prices.

Mr. W. Butler, Southport, has devised a new type of camera stand—called the Swingcam—to facilitate the photography of natural history subjects. The stand enables a photographer to point the lens of a camera at any angle and fix it in that position, without the use of a swinging back or front or any other independent attachment. The Swingcam tripod head can be fixed in a horizontal or vertical position, or at any angle, and is also capable of being inverted if desired. Naturalists and others who occasionally have to use cameras in awkward positions will no doubt find these devices a convenience.

New editions of two standard works already reviewed in these columns have just been received from Mr. Gustav Fischer, Jena. One is the seventh edition of the "Lehrbuch der Botanik" by Profs. Strasburger, Noll, Schenck and Karsten, and the other is the seventh edition of Dr. R. Hertwig's "Lehrbuch der Zoologie." Both works have been revised, so that they will maintain their high position among text-books of science.

We have received from Messrs. Henry Sotheran and Co., 140 Strand, W.C., a copy of their latest catalogue of second-hand books, including numerous scientific works; and from Messrs. John Wheldon and Co., 30 Great Queen Street, W.C., a catalogue of a miscellaneous collection of books, comprising many dealing with biology, geology, and mathematics.

Messrs. Dawbarn and Ward, Ltd., have published a second revised edition of "Photographic Failures: Prevention and Cure," by "Scrutator" of the *Photogram.*

OUR ASTRONOMICAL COLUMN.

Newly Discovered Nebulæ.—In No. 4013 of the *Astronomische Nachrichten* Prof. Max Wolf announces the discovery of a small, but beautiful, nebula the position of which, referred to the equator of 1900·0, is as follows:—$\alpha = 13^h.\ 58^m.\ 33{\cdot}44^s.,\ \delta = -9^\circ\ 39'\ 36''$. This object was discovered on a plate exposed during a search for minor planet (126), Velleda, and is of a spiral form, of the unusual S-shaped variety, the nucleus being of the fourteenth magnitude. Its diameter in R.A. is about $0'{\cdot}75$, and in dec. about $1'{\cdot}0$.

A second nebula of especial interest was found in the position (1900·0) R.A. = 13h. 58m. 15·17s., $\delta = -9^\circ\ 40'\ 10''$. This object is 1′ in length along its major axis, which has a position angle of about 120°, and is of the Andromeda nebula form.

The Bruce Telescope Reference Photographs.—When the 24-inch Bruce telescope of the Harvard College Observatory was being planned it was expected that the instrument might be useful in assisting in the discoveries of new satellites, and this expectation was realised in the discovery of Phœbe. A number of plates of each planet have been taken since 1893, and of these Prof. Pickering now gives the details as to object photographed, exposure, date and region, in Circular No. 97 of the Harvard College Observatory, hoping that the knowledge of their existence may assist other observers of possible satellites. The list includes 12 plates exposed for Mercury, 2 for Mars, 6 for Vesta, 21 for Jupiter, 12 for Uranus, and 3 for Neptune. The Saturn plates were fully described when the manner of the discovery of Phœbe was related in a former publication. The limiting magnitude of the objects shown on these plates may be taken as 17·0 or 17·5, and therefore the photographs may prove useful in the correction of the elements of Jupiter's newly discovered satellites when more is known of the positions of these two objects.

Comet 1904 II. (1904 *d*).—A continuation of the ephemeris for comet 1904 *d* is given in No. 4012 of the *Astronomische Nachrichten* by Herr M. Ebell.

This comet is now only about one-sixth as bright as when discovered, and is gradually becoming fainter. Its position on May 26, according to the ephemeris, will be α (true) = 2h. 23m. 48s., δ (true) = $+64^\circ\ 50'$, which is about 2° south of ι Cassiopeiæ, and the object is travelling slowly towards the constellation Camelus with a very slightly increasing declination.

Twelve Stars with Variable Radial Velocities.—Further results of the spectrographic work performed by the D. O. Mills expedition from Lick Observatory to the southern hemisphere are published in Bulletin No. 75 of that observatory.

Twelve stars have been found by Prof. Wright and Dr. Palmer to be spectroscopic binaries, some of them, mentioned below, having features of especial interest. α Phœnicis has a period of about 190 days. The system of θ Eridani has been found to be very similar to that of Mizar, the brightest component, θ_1, having a composite spectrum similar to that of the star named. α Puppis, α Volantis, α Carinæ, and κ and p Velorum are amongst the other stars of which the radial velocities have been found to be variable.

Double "Canals" on Mars in 1903.—In Bulletin No. 15 of the Lowell Observatory Mr. Lowell gives, and discusses in detail, the results of his observations of the Martian "canals" during 1903. Before proceeding to the account of the actual observations, he comments on the various theories which have been advanced in argument against the reality of the "doubling" phenomenon. The "diplopic" or out-of-focus theory is refuted for five reasons, the chief of which is that for any special epoch the width of each individual double canal remains constant.

The "interference" theory is met by the statements that in the case of these features there is no bright streak such as would be necessary to produce the two dark streaks to give the idea of a double canal, and that the width of each double canal does not vary with the aperture employed. Lastly, the "illusion," or, as Mr. Lowell refers to it, the "Small Boy," theory is considered,

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the chief argument against it being that the ambiguity of real and false effects only exists at the limit of vision, whereas most of the canals considered are, *when well seen*, far within this limit.

A number of interesting points concerning the canal systems are deduced from the 1903 observations, but only one or two of the more striking may be mentioned here. (1) The majority of the double canals do not exceed 3°·2 (degrees on the planet's surface) in width; (2) at the time of maximum visibility the two members of each double are generally of equal strength, but as they wane one of them usually becomes apparently stronger than the other; (3) the double canals appear to congregate in special longitudes and latitudes, in the latter case especially favouring the equatorial regions, a fact which Mr. Lowell urges as an argument against the "diplopic" theory; (4) the double canals are peculiar to the lighter regions of the planet's surface, although single canals are, apparently, just as numerous in the darker as in the lighter regions; the double canals, however, are always connected, directly, or through the medium of similar objects, with the darker areas.

CATALOGUE OF NEW DOUBLE STARS.—Prof. Hussey's ninth catalogue of double stars, discovered with the 12-inch and 36-inch refractors of the Lick Observatory, and mostly measured with the latter instrument, is contained in Bulletin No. 74 of that observatory. The preceding catalogues have severally appeared in Nos. 480, 485, and 494 of the *Astronomical Journal*, and Nos. 12, 21, 27, 57, and 65 of the Lick Observatory Bulletins.

The present publication gives the catalogue and D.M. numbers, the position and the distance and position-angle determined at each observation for each of the double stars recorded. The catalogue numbers extend from 801 to 1000 inclusive, and run consecutively.

THE ROYAL SOCIETY CONVERSAZIONE.

MANY instruments and devices of scientific interest were shown at the Royal Society's conversazione on Wednesday, May 17. As usual, the exhibits illustrated methods and results of recent work in various branches of science, and the subjoined summary of the official catalogue contains a few particulars relating to them.

In the course of the evening lantern demonstrations were given in the meeting-room by Dr. E. A. Wilson, Sir Oliver Lodge, and Mr. Perceval Landon. Sir Oliver Lodge demonstrated the use of electric valves for the production of high-tension continuous current. Electric vacuum valves, which it is now found were suggested in a letter by Sir George Stokes twenty years ago, have as their function the *entrapping* of a portion of electricity by permitting its passage in one direction and stopping its return. They therefore can be employed to accumulate electricity supplied from an intermittent or jerky source and to store it at a steady high potential; so that it may thereafter maintain a current through a very high resistance, as in electrostatics, and may produce X-rays, or point-discharge, or other continuous high-tension effects, and enable a small portable coil to imitate some of the effects of a much larger one by storage and accumulation of impulses. Among the applications contemplated are the separation of metallic fume and the dissipation of fog.—Dr. Edward A. Wilson showed a number of Antarctic views illustrating the life and work done on board the *Discovery* during the years 1902 to 1904, and views of the seals, penguins, and other birds met with in the Antarctic circle; and Mr. Perceval Landon exhibited pictures of the road to Lhasa.

The other exhibits are here grouped together according to subjects more or less closely related to one another.

Specimens illustrating the action of light and of radium upon glass: Sir William Crookes, F.R.S. (1) It is well known that many samples of colourless glass containing manganese slowly assume a violet tint when exposed to sunlight. In some specimens of glass exhibited the pieces were of all depths of tint, from deep violet, almost black in thick pieces, to pale amethyst. Analysis shows the glass to contain manganese. Heating the glass in a covered crucible to its softening point discharges the colour, leaving the glass white and transparent. The coloration is not superficial. On immersing a piece of the coloured glass in a liquid of about the same refractive index as itself, the colour is seen to have penetrated throughout the mass. Radium, acting for a few days, even through quartz, will produce as intense a coloration in a piece of this glass as exposure to the sun on the Pampa has taken years to effect. Six pieces of glass from the greenhouses at Kew Gardens illustrated changes which took probably about fifty years to complete in our climate. Purple spots were produced on two of these specimens by Sir William Crookes by the action of 15 milligrams of radium bromide in a quartz tube in the course of ten days, the beginning of change being well marked at the end of two days. In a specimen of manganese glass exposed to light for forty years as a pane of a greenhouse, the ends of the glass which had been protected from light by the window frame were colourless. In the expectation that radium might have a reducing effect on the manganese compound, Mr. F. Soddy submitted a portion of the pane to the action of 30 milligrams of radium bromide for three days in May, 1904. The colour, however, instead of being diminished, was intensified. Specimens were also shown illustrating the coloration of glass, quartz, and fluorspar by the β rays of radium.

Action of actinium or emanium emanation on a sensitive screen: Sir William Ramsay, K.C.B., F.R.S. Actinium or emanium are different names, adopted by Debierne and Giesel respectively, for the same substance, separable from pitchblende, and accompanying lanthanum. It gives off an emanation, of which the period of activity is very short—a few seconds. When this emanation impinges on a sensitive zinc sulphide screen, the screen becomes luminous. The luminous patch can be blown away, and in a second or two reappears.—Phosphorescence caused by the β rays of radium: Mr. G. T. Beilby. Phosphorescence of calcspar and other substances—(1) during exposure to the rays; (2) after removal from the rays; and (3) revived by heat after secondary phosphorescence has died down. The storage of phosphorescence and the coloration effects are due to partial electrolysis of the calcium carbonate or other substance by the stream of negative electrons. A proportion of the ions re-combine at once, others continue to re-combine after the rays have ceased to act, and the remainder only re-combine when the mobility of the crystal molecules is increased by heat.—Skiagrams of the hands of Machnow, the Russian giant, and of O'Brien, the Irish giant: Mr. S. G. Shattock.

Large echelon spectroscope: Prof. A. Schuster, F.R.S. This echelon spectroscope, constructed by Messrs. Adam Hilger, Ltd., consists of 33 plates, and has a resolving power equal to that of an ordinary grating of 329,000 lines in the first order.—A hand refractometer: Mr. G. F. Herbert Smith. By means of this form of refractometer the refractive indices of any translucent substance, the refractive power of which lies within the effective range of the instrument, 1·400 to 1·760 approximately, may be determined with ease and celerity, to units in the second place of decimals if ordinary light, and to two or three units in the third place of decimals if the monochromatic light emitted by a volatilising sodium salt be the source of illumination.—The Ashe-Finlayson comparascope: Mr. D. Finlayson. This accessory to the microscope has been designed to enable the images of two different objects, separately mounted, to be projected side by side into the field of view, thereby enabling a thorough comparison to be made of their respective points of difference and resemblance. The apparatus consists of a prism placed above the primary objective which reflects to the ocular the rays from a secondary objective placed at right angles to the optic axis of the microscope.—(1) Torsion balance, used in radiation pressure measurements, by Nichols and Hull; (2) vacuum tube, of Nichols and Hull, to illustrate the repulsion of comet tails by the sun: Prof. E. F. Nichols.—An optical appliance to facilitate visual perception of ultra-microscopic particles: Mr. Carl Zeiss. The apparatus consists of a projection table provided with an arc lamp, optical bench, two projection aplanats, and a precision slit. (The use of sunlight instead of the arc lamp is preferable.) Particles of far less than half a wave-length can be made visible with this apparatus.—

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